

## UNITED STATES PATENT OFFICE.

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MANUFACTURE OF NITROCELLULOSE SMOKELESS POWDER.

No Drawing.

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In the current method of manufacturing nitro-cellulose powder, after nitration, it is most thoroughly washed in clean water, to utterly eliminate the very dangerous free nitric acid. And is then treated with alcohol or ether. Which first acts as a dryer, absorbing the superfluous moisture. And secondly acts as a solvent, making possible the moulding of the dried and dissolved nitro-cellulose into the desired shapes of the finished powder grain. Also, during this process, there is further incorporated about four-tenths of one per cent of some greasy "stabilizer" whose office is to both water-proof the powder particles against disintegrating moisture. And also cushion those particles against sudden shocks.

My invention or improvement, upon which I ask a patent, is the combination of all three operations of drying, dissolving, and stabilizing in one operation. By substituting for the alcohol or ether, and for the stabilizer, mononitrotoluene. There being about 5%, more or less, of the said mononitrotoluene in the finished powder the exact proportion being always determined by the stiffness of the final paste, which should be as stiff as is compatible with the moulding of the completed powder grain.

And the stated mononitrotoluene solvent, after initially driving off the superfluous water, furthestmost efficiently fills the office of the needed stabilizer, previously occupied by the paraffin, or some greasy nitrocarbon, or similar substance. And being still more intimately incorporated, as solvent, than any greasy substance afterwards added, it far better preserves the finished powder particles, both from sudden shocks, and from dampness. Which dampness, by setting up progressive disintegration, leads to an increasing instability. While, on the other hand, the intimate molecular greasing, also prevents the old, long stored powder becoming so hard and horn-like, that it is increasingly liable to premature explosion through static electrical sparking, through friction against its companion powder grains. Both the disintegrating moisture, and its opposite, the drying to a hard horn-like substance, making the finished powder increasingly dangerous to handle, or even to store, and ever progressively unfitted for use.

And this employment of mononitrotoluene,

as dryer, solvent, and stabilizer, all in one, not only gives greater safety, stability, and good keeping qualities, but also makes a far more efficient powder since when the present dryer and solvent, alcohol or ether, and the present stabilizer are employed, there remains but about 84% active explosive. And of this about 6% must be employed in gasifying the solvent and stabilizer, when the powder is fired in the gun. Giving us, therefore, but about 88% of the powder doing its actual work.

But mononitrotoluene is itself a very powerful, although very safe explosive and the smokeless powder in which it is incorporated as dryer, solvent, and stabilizer, has thus no inert ingredients, but is 100% efficient and yet it is at the same time entirely safe for when tri-nitro-toluene (T. N. T.) is manufactured, it is usually in three stages. First as mono-, then as di-, and finally as tri-nitro-toluene. And even in this final thrice nitrated and most explosive stage it is quite safe to handle so that the first and weakest stage of mono-nitro-toluene is entirely safe.

It is also very cheap; and easily obtainable in any desired quantities, and with any desired secrecy. Since the smokeless powder manufacturers will certainly also be making T. N. T. And can thus easily switch over some of the toluene in its first nitration.

Another very valuable feature is that no new machinery, or upset of the present routine is demanded. In place of the expensive alcohol and ether, and the subsequent imperfect incorporation of some stabilizer, you simply use the cheap and abundant mononitrotoluene, and all operations are completed.

While one great advantage that should not be overlooked is the total elimination of those innumerable vexations and harassments that ever attend the employment of alcohol or ether, especially when these are needed in vast quantities.

I claim:

1. A nitrocellulose smokeless powder comprising mononitrotoluene as a solvent and stabilizer.

2. In the manufacture of nitrocellulose smokeless powder the step of simultaneously drying, dissolving, and stabilizing the nitrocellulose by means of mononitrotoluene.

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